

IN THE CLAIMS

Please amend the claims as follows:

1. (Currently Amended) A path search method for detecting respective timings of path components included in a signal received via a multipath propagation path, said method comprising the steps of:

a first path search step ~~for~~ detecting respective timings of path components using pilot symbols of a known phase included in said signal received via the multipath propagation path; and

a second path search step ~~for~~ detecting respective timings of path components using information symbols derived from a signal demodulated according to said timings detected in the first path search step and said pilot symbols of ~~a~~ the known phase.

2. (Currently Amended): The path search method as claimed in claim 1, wherein said information symbols derived from the signal demodulated according to the timings detected in the first path search step are generated by ~~implementing the steps of:~~

despreading said signal received via the multipath propagation path according to said timings detected in the first path search step;

cophasing and summing the information symbols despreaded according to said respective path timings in a symbol by symbol manner;

demodulating and implementing data decision of said cophased and summed respective information symbols; and

remodulating said data decision signal.

3. ( Currently Amended): The path search method as claimed in claim 2, wherein information symbols satisfying a predetermined condition, of said information symbols

derived from the signal demodulated according to the timings detected in the first path search step, are selected and fed back ~~such that information symbols satisfying a predetermined condition are selected.~~

4. (Original): The path search method as claimed in claim 1, wherein said second path search step is repeated until a predetermined condition is satisfied.

5. (Original): The path search method as claimed in claim 1, wherein said signal received via the multipath propagation path is transmitted in accordance with a multicarrier code division multiplex system.

6. (Currently Amended) A channel estimation method for estimating channel variation using pilot symbols by detecting respective timings of path components included in a signal received via a multipath propagation path, said method comprising:

~~a pilot symbol acquiring step for acquiring pilot symbols of a known phase included in received packets; and~~

a first path search step detecting respective timings of path components using pilot symbols of a known phase in said signal received via the multipath propagation path;

a first channel estimation step estimating the channel variation using the pilot symbols of the known phase, after said first path search step;

a second path search step detecting respective timings of path components using the timings detected in said first path search step, information symbols derived from a signal demodulated according to said first channel estimation step, and the pilot symbols of the known phase; and

~~a second channel estimation step for implementing channel estimation using said acquired pilot symbols~~ estimating the channel variation using the information symbols derived from the signal demodulated according to said first channel estimation step, and the pilot symbols of the known phase, according to the timings detected in said second path search step.

7-8. (Cancelled)

9. (Currently Amended) The channel estimation method as claimed in claim 1 ~~6~~, wherein said first and second channel estimation step ~~implements steps implement~~ channel estimation by combining said pilot symbols of a the known phase and pilot symbols included in other packets transmitted from the same transmission source.

10-14. (Cancelled)

15. (Currently Amended): A The channel estimation method ~~estimation method for estimating variation using pilot symbols, said method comprising:~~

~~a pilot symbol acquiring step for acquiring pilot symbols of a known phase included in a received packet;~~ as claimed in claim 6, wherein said second channel estimation step includes:

~~a tentative channel estimation step for tentative channel estimation using said acquired pilot symbols;~~

~~a tentative data decision information symbol generating step for compensating for the channel variation in accordance with a result of said tentative~~ a first channel estimation of

said first channel estimation step and generating tentative data decision information symbols from the compensated information symbols; and

~~a channel estimation step for generating information symbols wherefrom~~ devoid of modulation components ~~are removed~~ said tentative data decision information symbols and implementing a second channel estimation of said second channel estimation step using said pilot symbols and information symbols.

16. (Currently Amended): The channel estimation method as claimed in claim 15, wherein said generating the tentative data decision information symbol ~~generating step~~ includes a weighting process for weighting said tentative data decision information symbols according to ~~the~~ a reliability.

17. (Currently Amended): The channel estimation method as claimed in claim 15, wherein said generating the tentative data decision information symbol ~~generating step~~ includes an error correction process for error correction decoding said tentative data decision information symbols ~~after~~ implementing an error correction encoding again.

18. (Currently Amended): The channel estimation method as claimed in claim ~~17~~ 15, wherein said generating the tentative data decision information symbol ~~generating step~~ includes a weighting process for weighting said ~~error correction coded~~ tentative data decision information symbols after the error correction encoding according to ~~the~~ a reliability.

19-20. (Cancelled)

21. (Currently Amended): The communication device as claimed in claim 20, ~~wherein said path search means includes~~ 25, further comprising:

~~a first path search part for detecting respective timings of path components using said pilot symbols~~ channel estimation part configured to estimate a channel variation after a first path search by said first path search part; and

~~a second path search part for detecting respective timings of path components~~ channel estimation part configured to estimate a channel variation using an information symbols derived from a signal demodulated according to said timings detected in the first path search channel estimation part and said pilot symbols of the known phase, according to the timings detected in a second path search by said second path search part.

22. (Currently Amended): The communication device as claimed in claim 20 ~~or~~ 21, wherein said first channel estimation ~~means~~ part includes:

~~a pilot symbol acquiring part for acquiring~~ configured to acquire the pilot symbols of the known phase included in said reception signal a received packet; and

~~a channel estimation part for implementing~~ configured to implement a channel estimation using said acquired pilot symbols.

23. (Currently Amended): The communication device as claimed in claim 22 21, wherein said second channel estimation part includes:

~~a tentative channel estimation part for implementing tentative channel estimation using said acquired pilot symbols;~~

~~a tentative data decision information symbol generating part for compensating~~ configured to compensate for the channel variation in accordance with a result of said tentative channel estimation a first channel estimation by said first channel estimation part,

and ~~generating a~~ to generate tentative data decision information symbols from the compensated information symbols; and

a channel estimation part ~~for generating~~ configured to generate an information symbol ~~wherefrom that is devoid of~~ modulation components ~~are removed~~ using said tentative data decision information symbols and ~~implementing~~ to implement a second channel estimation by said second channel estimation part using said pilot symbols and information symbols.

24. (Currently Amended): The communication device as claimed in claim 22, wherein said pilot symbol acquiring part includes:

a subcarrier acquiring part ~~for acquiring~~ configured to acquire a plurality of subcarriers included in said reception signal; and

a pilot symbol acquiring ~~step for acquiring~~ part configured to acquire a plurality of pilot symbols of a known phase included in said plurality of subcarriers, respectively, ~~and,~~

wherein said first and second channel estimation ~~part implements~~ parts implement a channel estimation for each of said subcarriers using said plurality of pilot symbols.

25. (Currently Amended): A communication device for implementing a path search ~~for detecting that detects~~ respective timings of path components included in a signal received via a multipath propagation path, said device comprising:

a first path search part ~~for detecting~~ configured to detect respective timings of path components using pilot symbols of a known phase included in said signal received via the multipath propagation path; and

a second path search part ~~for detecting~~ configured to detect respective timings of path components using ~~an~~ information symbols derived from a signal demodulated according to

said timings detected in the first path search step and said pilot symbols of a the known phase.

26-30. (Cancelled)

31. (Currently Amended): A The communication device ~~comprising:~~

~~path search means for performing a first path search step in which respective timings of path components are detected using pilot symbols of a known phase included in a reception signal received via a multipath propagation path, and~~

~~channel estimation means for performing a first channel estimation step in which channel estimation is implemented for estimating channel variation after said first path search step, as claimed in claim 21, wherein said path search means implements second channel estimation part recursively implements a path search and a channel estimation by repeating processes of implementing a second path search step in which respective channel estimation that estimates a channel variation by timings of path components are detected using information symbols derived from a signal, demodulated after a first channel estimation of said first channel estimation step part according to said timings detected in the first a second path search step of said second path search part and said pilot symbols of a known phase, and wherein said channel estimation means implements a second channel estimation step in which channel estimation is implemented for estimating channel variation using information symbols derived from a signal demodulated after said first channel estimation step according to said timings detected in the second path search step and said pilot symbols of a known phase, and thereafter implementing the second path search using information symbols derived from a signal demodulated after the second channel estimation and the pilot symbols, recursively implementing path search and channel estimation by repeating the processes of~~

~~implementing said second path search step using said information symbols demodulated after said second channel estimation step and pilot symbols~~ and implementing said second channel estimation ~~step~~ using information symbols fed back in accordance with the timing detected in said second path search ~~step~~ and the pilot symbols.

32-35. (Cancelled)

36. (Currently Amended): ~~The~~ A communication device ~~as claimed in claim 34 or 35, further~~ comprising:

a path search and channel estimation part configured to carry out at least one of a path search and a channel estimation using pilot symbols of a known phase included in a signal received via a multipath propagation path and information symbols; and

a feedback means for feeding part configured to feed back said information ~~symbol~~ symbols,

wherein said path search and channel estimation ~~means~~ part recursively implements the path search and the channel estimation by repeating processes of implementing a path search using information symbols decoded after channel estimation and the pilot symbols and implementing a channel estimation using the information symbols fed back via said feedback ~~means~~ part in accordance with a timing detected in said path search and the pilot symbols.

37. (New): The channel estimation method as claimed in claim 6, wherein said first channel estimation step includes:

acquiring the pilot symbols of the known phase included in a received packet; and  
implementing a first channel estimation using the acquired pilot symbols.